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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/886,675	06/20/2001	Giorgio Grasso	CISCP684	6479

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EXAMINER	
BELLO, AGUSTIN	
ART UNIT	**PAPER NUMBER**
2633	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

mJ

Office Action Summary	Application No.	Applicant(s)	
	09/886,675	GRASSO, GIORGIO	
	Examiner	Art Unit	
	Agustin Bello	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ______.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ______.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Webb (U.S. Patent Application Publication No. 2002/0075546) in view of Morey (U.S. Patent No. 5,007,705).

Regarding claims 1, 11, and 15, Webb teaches an optical transmitter (Figure 2) comprising: a coherent light source (e.g. laser, reference numeral 6 in Figure 2); a frequency control loop (e.g. feed-back loop shown in Figure 2 between elements 6, 14, 16, 18 and described in paragraph 0011) that measures (e.g. measures power of transmitted and removed sidebands as described in paragraph 0035) and controls a transmission frequency (paragraphs 0013, 0031, 0035-0036) of said coherent light source (reference numeral 6 in Figure 2), and an optical filter (reference numeral 12 in Figure 2 and described in paragraphs 0013-0014) having a controllable frequency (e.g. the ability to control the position of the rising edge of the notch in the transmission profile; paragraphs 0013-0014, 0032, 0036) that filters a modulated signal derived (e.g. via modulator 10 in Figure 2) from said coherent light source (paragraph 0035), and wherein said frequency control loop (e.g. feed-back loop shown in Figure 2 between elements 6, 14, 16, 18 and described in paragraph 0011) tunes said controllable frequency (e.g. the positional shift of the rising edge of the notch in the transmission profile; paragraphs 0013-0014, 0032,

0036) to be a fixed spacing away from said transmission frequency (e.g. due to the fact that the notch produced by the filter is not a perfect square, the rising edge of the notch will be a fixed spacing away from the transmission frequency when the control loop attempts to arrange the rising edge so that it coincides with the transmission frequency; Figure 3, paragraphs 0032-0034).

Webb differs from the claimed invention in that Webb fails to explicitly teach that the center frequency of the optical filter is controllable and that the frequency control loop tunes the controllable center frequency to be a fixed spacing away from said transmission frequency. However, Webb's disclosure teaches that the optical filter is a controllable grating (reference numeral 12 in Figure 2) that produces a notch in the transmission profile bounded by a frequency at the falling edge (reference numeral 20 in Figure 3) and a frequency at the rising edge, thereby suggesting that a controlled positional shift dictated by the frequency control loop in the rising edge of the notch (paragraphs 0011,0014,0032) would likewise result in a positional shift in the falling edge of the notch. Since the center frequency of the notch in the transmission profile lies at the midpoint between the frequency of the falling edge and the frequency of the rising edge, Webb further suggests that the center frequency of the optical filter would be controllably shifted in tandem with the frequencies of rising edge and the falling edge. Furthermore, Webb's positional shift of the rising edge frequency is accomplished via temperature control (paragraph 0014), a method well known for allowing one to controllably shift the center frequency of an optical filter, particularly a filter comprising a grating such as that taught by Webb. As such, Webb's positional shift of the rising edge frequency and temperature control of the grating suggest that the center frequency of the optical filter is likewise controllable and further that it

can be tuned to a desired frequency spacing away from the transmission frequency according to Webb's desire to match the rising edge frequency to the transmission frequency. Moreover, Morey, in the same field of endeavor, explicitly teaches that it is well known in the art to controllably shift the center frequency of an optical filter of the grating type disclosed by Webb by controlling the temperature of the fiber grating (column 1 line 34 - column 2 line 2, column 3 lines 26-62, and column 6 lines 16-26). One skilled in the art would clearly have recognized that the temperature control method disclosed by Webb for shifting the rising edge frequency of the optical filter could also have been used to controllably shift the center frequency of the optical filter according to the disclosure of Morey. One skilled in the art would have been motivated to controllably shift the center frequency of the optical filter of Webb according to the disclosure of Morey in order to take advantage of wavelength selectivity provided by the narrow band response of the optical fiber grating filter (column 1 lines 60-62 of Morey). Furthermore, there would have been a reasonable expectation of success for one skilled in the art in implementing the method of Morey in the device of Webb since Webb teaches the components necessary for tuning the controllable center frequency of the optical fiber grating filter according to the disclosure of Morey, namely a fiber grating and a grating temperature controller. Therefore, it would have been obvious to one skilled in the art at the time the invention was made that the center frequency of the optical fiber grating filter of Webb could be controllably shifted by controlling the temperature of the optical fiber grating filter, as suggested by Webb in the use of a grating temperature controller and explicitly taught by Morey, and further that the controllable center frequency could be tuned, according to the disclosure of Morey, to be a fixed spacing away from said transmission frequency consistent with the disclosure of Webb.

Regarding claims 2, 12, and 16, Webb teaches that said optical filter outputs a VSB signal (e.g. "Vestigial sideband signal" shown as being output from grating 12 in Figure 2).

Regarding claim 3, Webb teaches a modulator (reference numeral 10 in Figure 2) that amplitude modulates (e.g. both vestigial sideband modulation in paragraph 0030 and return to zero modulation in paragraph 0037 being forms of amplitude modulation) output of said coherent light source (reference numeral 6 in Figure 2) to transmit digital information (e.g. "Data" being input to element 8 in Figure 2 in the NRZ or RZ digital format).

Regarding claims 4, 13, and 17, Webb teaches that a bandwidth (e.g. notch in transmission profile shown in Figure 3) of said optical filter (reference numeral 12 in Figure 2) is between 0.4 and 0.7 times a bit rate equivalent bandwidth of said digital information. Webb (paragraph 0030, paragraph 0032) teaches that the bandwidth of the optical filter is arranged so that substantially half or 0.5 of the bit rate equivalent bandwidth of the digital information is allowed to pass while the other half or 0.5 is reflected. Therefore, Webb meets the limitations of the claim in that the filter provides a bandwidth of 0.5 that falls within the range of 0.4 and 0.7 times a bit rate equivalent bandwidth of said digital information claimed.

Regarding claims 5, 14, and 18, the combination of Webb and Morey obviates the controllable center frequency of the optical filter as discussed regarding claim 1, and Webb teaches that a difference between said transmission frequency of said coherent light source (e.g. vertical line in Figure 3) and said controllable center frequency (e.g. the midpoint between falling edge frequency 20 and the rising edge frequency shown in Figure 3) is between 0.2 and 0.35 times a bit rate equivalent bandwidth of said digital information. As discussed regarding claim 4, Webb teaches that the bandwidth of the optical filter is arranged so that substantially

half or 0.5 of the bit rate equivalent bandwidth of the digital information is allowed to pass while the other half or 0.5 is reflected. The filter, having a bandwidth of half or 0.5 of the bit rate equivalent bandwidth of the digital information, will have a center frequency at a midpoint of the 0.5 bandwidth of the filter and will be located at the midpoint between falling edge frequency and the rising edge frequency shown in Figure 3. As such, this midpoint or center frequency of the optical filter would be located at 0.25 times the bit rate equivalent bandwidth of the digital information by virtue of the fact that half of the 0.5 bandwidth of the filter equals 0.25. The midpoint located at 0.25 times the bit rate equivalent bandwidth of the digital information falls within the claimed range of 0.2 and 0.35 times the bit rate equivalent bandwidth of the digital information.

Regarding claim 6, the combination of Webb and Morey teaches a WDM optical transmission system (paragraph 0017 of Webb) comprising: a plurality of optical transmitters (paragraph 0017 of Webb), at least one of said optical transmitters comprising: a coherent light source (e.g. laser, reference numeral 6 in Figure 2 of Webb); a frequency control loop (e.g. feed-back loop shown in Figure 2 between elements 6, 14, 16, 18 and described in paragraph 0011 of Webb) that measures (e.g. measures power of transmitted and removed sidebands as described in paragraph 0035 of Webb) and controls a transmission frequency (paragraphs 0013, 0031, 0035-0036 of Webb) of said coherent light source (reference numeral 6 in Figure 2 of Webb), and an optical filter (reference numeral 12 in Figure 2 and described in paragraphs 0013-0014 of Webb) having a controllable center frequency (obviated by the combination of Webb and Morey as discussed regarding claim 1 above) that filters a modulated signal derived (e.g. via modulator 10 in Figure 2 of Webb) from said coherent light source (paragraph 0035 of Webb), and wherein

said frequency control loop (e.g. feed-back loop shown in Figure 2 between elements 6, 14, 16, 18 and described in paragraph 0011 of Webb) tunes said controllable center frequency (obviated by the combination of Webb and Morey as discussed regarding claim 1 above) to be a fixed spacing away from said transmission frequency (e.g. the rising edge frequency of the notch will coincide with transmission frequency while the center frequency of the optical filter obviated by the combination of Webb and Morey will be a fixed spacing away from the transmission frequency).

The combination of references differs from the claimed invention in that it fails to specifically teach that each of the optical transmitters in the WDM system comprises the elements taught by the combination of references. However, Webb suggests as much in reciting that at least one of the optical transmitters in the WDM transmission system is of the type taught by the combination of references (paragraph 0017) and further, that the reduction in bandwidth of the transmitted signal enables additional channels to be fitted into the existing system bandwidth thereby increasing the system transmission capacity (paragraph 0033, paragraph 0030, paragraph 0037). Furthermore, one skilled in the art would have been motivated to design each transmitter according to the specifications of the combination of references in order to take full advantage of the reduction in bandwidth created by the system and method of the combination of references to, in effect, double the system transmission capacity of the system by reducing the bandwidth of each channel by half. There would have been a reasonable expectation of success for one skilled in the art in implementing the design of the combination of references in each of the transmitters since Webb contemplated that the transmitters would be implemented in a WDM communication system. Therefore, it would have been obvious to one

skilled in the art at the time the invention was made to design each of the optical transmitters according to the specifications of the combination of references in order to increase overall system capacity.

Regarding claim 7, the combination of Webb and Morey obviate designing each of the optical transmitters of a WDM optical transmission system according to the specification of the combination of references, and further teach a modulator (reference numeral 10 in Figure 2) that amplitude modulates (e.g. both vestigial sideband modulation in paragraph 0030 and return to zero modulation in paragraph 0037 being forms of amplitude modulation) output of said coherent light source (reference numeral 6 in Figure 2) to transmit digital information (e.g. "Data" being input to element 8 in Figure 2 in the NRZ or RZ digital format).

Regarding claim 8, the combination of Webb and Morey obviate designing each of the optical transmitters of a WDM optical transmission system according to the specification of the combination of references, and further the combination of references teaches that a bandwidth (e.g. notch in transmission profile shown in Figure 3) of said optical filter (reference numeral 12 in Figure 2) is between 0.4 and 0.7 times a bit rate equivalent bandwidth of said digital information. Webb (paragraph 0030, paragraph 0032) teaches that the bandwidth of the optical filter is arranged so that substantially half or 0.5 of the bit rate equivalent bandwidth of the digital information is allowed to pass while the other half or 0.5 is reflected. Therefore, Webb meets the limitations of the claim in that the filter provides a bandwidth of 0.5 that falls within the range of 0.4 and 0.7 times a bit rate equivalent bandwidth of said digital information claimed.

Regarding claim 9, the combination of Webb and Morey obviate designing each of the optical transmitters of a WDM optical transmission system according to the specification of the

combination of references, and further teach that a difference between said transmission frequency of said coherent light source (e.g. vertical line in Figure 3) and said controllable center frequency (e.g. the midpoint between falling edge frequency 20 and the rising edge frequency shown in Figure 3) is between 0.2 and 0.35 times a bit rate equivalent bandwidth of said digital information. As discussed regarding claim 8, Webb teaches that the bandwidth of the optical filter is arranged so that substantially half or 0.5 of the bit rate equivalent bandwidth of the digital information is allowed to pass while the other half or 0.5 is reflected. The filter, having a bandwidth of half or 0.5 of the bit rate equivalent bandwidth of the digital information, will have a center frequency at a midpoint of 0.25 of the bit rate equivalent bandwidth of the digital information and will be located at the midpoint between falling edge frequency and the rising edge frequency shown in Figure 3. As such, this midpoint or center frequency of the optical filter would be located at 0.25 times the bit rate equivalent bandwidth of the digital information and fall within the claimed range of 0.2 and 0.35 times the bit rate equivalent bandwidth of the digital information.

Regarding claim 10, the combination of references differs from the claimed invention in that it fails to specifically teach that the transmission frequencies of said coherent light sources of said optical transmitters can be spaced more closely than twice a bit rate equivalent bandwidth of said digital information. However, the combination of references and Webb in particular suggest that the transmission frequencies of said coherent light sources of said optical transmitters can be spaced more closely than twice a bit rate equivalent bandwidth of said digital information (paragraph 0033, paragraph 0030, paragraph 0037). Furthermore, one skilled in the art would clearly have recognized that the method taught by Webb allows one to space transmission

frequency closer than twice a bit rate equivalent bandwidth of said digital information since half of the bit rate equivalent bandwidth has been eliminated by optical filtering. Since half of the bit rate equivalent bandwidth becomes available, one skilled in the art could space the transmission frequency of another light source at a distance less than the typically required twice the bit rate equivalent bandwidth without producing cross-talk or overlap between the bit rate equivalent bandwidths of the transmission frequencies. One skilled in the art would have been motivated to do so in order to increase overall transmission capacity – a benefit observed in the disclosure of Webb (paragraph 0037). One skilled in the art could have expected a reasonable degree of success in spacing the transmission frequencies of said coherent light sources of said optical transmitters more closely than twice a bit rate equivalent bandwidth of said digital information since the combination of references and Webb in particular provide a method and apparatus for doing so effectively. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to space the transmission frequencies of said coherent light sources of said optical transmitters more closely than twice a bit rate equivalent bandwidth of said digital information as suggested by the combination of references and Webb in particular in order to increase overall transmission capacity.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Agustin Bello
Examiner
Art Unit 2633

AB

A. Bello